NATIONAL MARINE SANCTUARY PROGRAM ALTERNATIVES ANALYSIS OF PROPOSED MANAGEMENT ACTIONS FOR DAVIDSON SEAMOUNT AND CORDELL BANK

Executive Summary

Pursuant to the National Marine Sanctuaries Act (NMSA) (16 U.S.C. § 304(a)(5)), the Monterey Bay National Marine Sanctuary (MBNMS) and Cordell Bank National Marine Sanctuary (CBNMS) are presenting the Pacific Fishery Management Council (PFMC) with the opportunity to prepare draft sanctuary fishing regulations that are consistent with the goals and objectives for each proposed sanctuary action. This document provides background information, describes management alternatives, preferred actions, rationales, and model regulatory language relating to the protection of physical and biological resources on and above the Davidson Seamount and Cordell Bank.

The opportunity to prepare draft sanctuary fishing regulations for MBNMS and CBNMS is being presented jointly for efficiency. However, if the PFMC chooses to prepare draft sanctuary fishing regulations, we request that the PFMC prepare draft sanctuary fishing regulations for the proposals specific to each sanctuary. In preparing draft sanctuary regulations for fishing in MBNMS and CBNMS, the PFMC would be acting under the authority of the NMSA and may address all species of fishes and invertebrates. The PFMC is therefore not restricted to the species or activities regulated under its current fishery management plans. Regulations for these actions would be analyzed in the Draft Environmental Impact Statement that will be prepared for the revised management plans and regulations of these sanctuaries.

I. INTRODUCTION

A. Background

The National Marine Sanctuary Program (NMSP) consists of a system of 13 National Marine Sanctuaries administered by the National Oceanic and Atmospheric Administration (NOAA). The MBNMS was established in 1992 and is the largest in the system. Stretching from Marin County to the town of Cambria, the MBNMS encompasses a shoreline length of 276 miles and 5,322 square miles (4,709 square nautical miles) of ocean. Supporting a diversity of marine ecosystems, it is home to numerous mammals, seabirds, fishes, invertebrates, and plants in a remarkably productive coastal environment. The MBNMS was established for the purpose of resource protection, research, education, and public use of this national treasure.

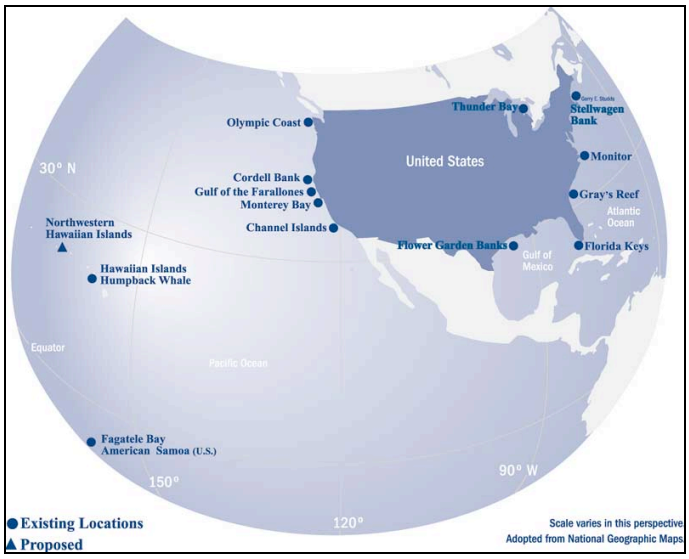


Figure 1: The National Marine Sanctuary System

Cordell Bank National Marine Sanctuary is located approximately 50 miles (43 nautical miles) northwest of the Golden Gate Bridge, at the edge of the continental shelf. Cordell Bank rises dramatically from the soft sediments of the seafloor. Along a few ridges and pinnacles, the Bank rises to within 120 feet of the ocean surface. Upwelling of nutrient rich ocean waters and the Bank's topography create an exceptionally productive marine area. Cordell Bank provides critical habitat and is an important feeding area for resident and migratory species of marine mammals, seabirds and fishes and supports a rich benthic invertebrate community. The significant value of this marine habitat was officially recognized in 1989 when 526 square miles (397 square nautical miles) of Pacific Ocean including and surrounding Cordell Bank were designated as a national marine sanctuary.

B. Management Plan Review

The 1992 reauthorization of the National Marine Sanctuaries Act required that each of the national marine sanctuaries engage in a management plan review process every five years to reevaluate site specific goals and objectives, management techniques, and strategies. This management plan review process has provided MBNMS and CBNMS with the opportunity to take a closer look at how their environments have changed over the past twenty years, understand the cause and effect relationship of human activity and natural perturbations on marine resources, and to engage the public in the management decision making process. Management plans are sanctuary-specific documents that describe regulations and boundaries, outline staffing and budget needs, present management actions and performance measures, and guide development of future budgets and management activities.

The management plan review process is based on five fundamental steps: 1) public scoping meetings; 2) the prioritization of issues; 3) creation of working groups to participate in development of action plans; 4) endorsement of the components of draft management plan by Sanctuary Advisory Councils (SAC); and 5) the preparation of draft and final management plans and the relevant National Environmental Policy Act (NEPA) documentation (such as an Environmental Impact Statement or Environmental Assessment). Public hearings on the draft

plan help staff revise the document into a final management plan, which, once approved, will outline a sanctuary's priorities for the next five to ten years. The draft priority issue-based action plans can be viewed at www.sanctuaries.nos.noaa.gov/jointplan/.

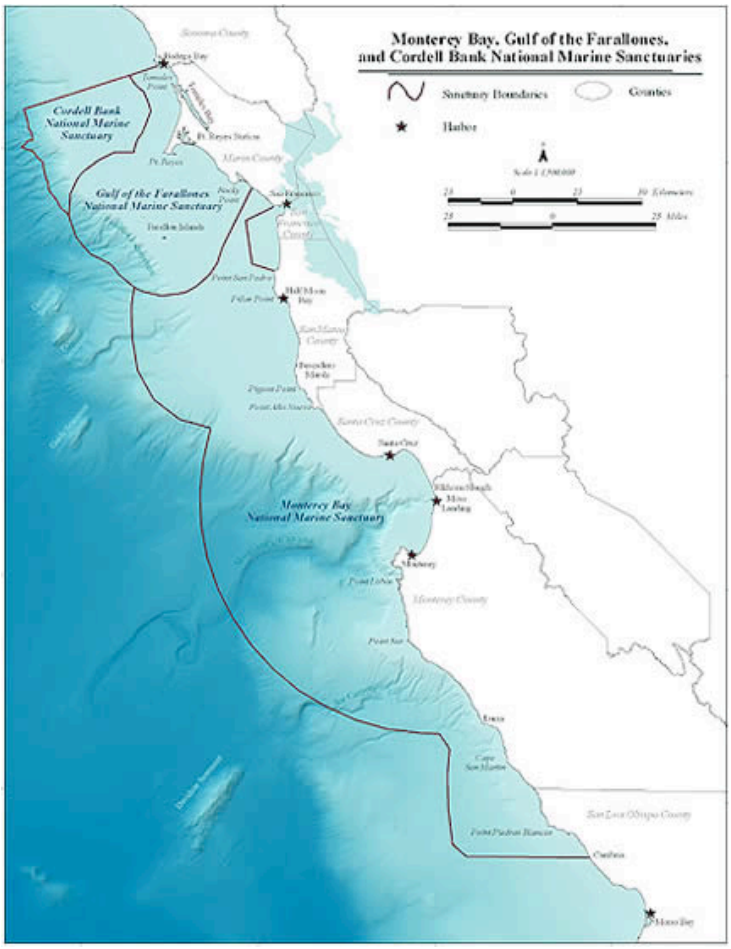


Figure 2: Cordell Bank, Gulf of the Farallones, and Monterey Bay National Marine Sanctuaries

C. Interaction with the Pacific Fishery Management Council

The priority issues identified during the management plan process included considering the Davidson Seamount for Sanctuary designation and the appropriate level of accompanying regulatory protection.. The SAC unanimously approved incorporation and protection of the Davidson Seamount. The scope of this section 304(a)(5) interaction with PFMC is limited to potential Sanctuary fishing regulations in the seamount area. It does not involve the consideration of Sanctuary designation of the area or boundary alternatives (There will be other opportunities to comment on those issues). Also addressed during the management plan process was the need to better protect the fragile benthic invertebrate community living on the upper ridges and pinnacles of Cordell Bank. Both of the preferred actions regarding these issues involve fishing regulations and therefore involve engaging in the section 304(a)(5) process with PFMC.

The sanctuaries are guided by the provisions of section 304(a)(5) of the NMSA, (16 U.S.C. 1434(a)(5). This section states that:

> *The Secretary shall provide the appropriate Regional Fishery Management Council with the opportunity to prepare draft regulations for fishing within the Exclusive Economic Zone, as the Council may deem necessary to implement the proposed designation. Draft regulations prepared by the Council, or a Council determination that regulations are not necessary pursuant to this paragraph, shall be accepted and issued as proposed regulations by the Secretary unless the Secretary finds that the Council's action fails to fulfill the purposes and policies of this chapter and the goals and objectives of the proposed designation. In preparing the draft regulations, a Regional Fishery Management Council shall use as guidance the national standards of section 301(a) of the Magnuson-Stevens Act (16 U.S.C. 1851) to the extent that the standards are consistent and compatible with the goals and objectives of the proposed designation. The Secretary shall prepare the fishing regulations, if the Council declines to make a determination with respect to the need for regulations, makes a determination which is rejected by the Secretary, or fails to prepare the draft regulations in a timely manner. Any amendments to the fishing regulations shall be drafted, approved, and issued in the same manner as the original regulations. The Secretary shall also cooperate with other appropriate fishery management authorities with rights or responsibilities within a proposed sanctuary at the earliest practicable stage in drafting any sanctuary fishing regulations.*

In drafting regulations pursuant to the requirements of the National Marine Sanctuaries Act, the Council is drafting sanctuary regulations to be promulgated under the National Marine Sanctuaries Act and is therefore not limited to restricting fishing activities for managed species.

II. DAVIDSON SEAMOUNT

In accordance with section 304(a)(5) of the NMSA, MBNMS is providing PFMC with the opportunity to draft sanctuary regulations that meet the goals and objectives for the preferred alternative listed below.

A. Background

1. Seamounts

Seamounts have been defined as steep geologic features rising from the seafloor with a minimal elevation of 1,000 meters and with a limited extent across the summit. This definition is not strictly adhered to in the literature, and steep undersea mountains are often referred to as seamounts regardless of size. Seamounts have a variety of shapes, but are most often conical with a circular, elliptical, or more elongate base. They are usually of volcanic origins. It has been estimated that there are more than 30,000 seamounts over 1,000 meters tall in the Pacific Ocean, approximately 800 in the Atlantic Ocean, and an indeterminate number in the Indian Ocean.

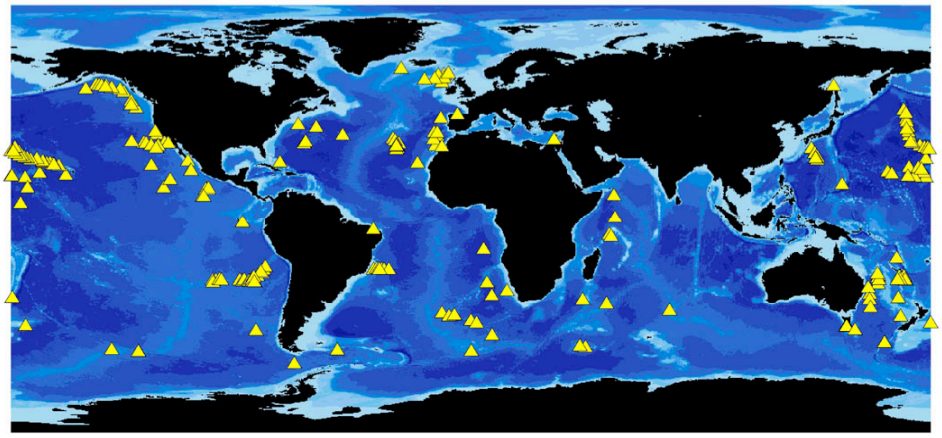


Figure 3: Sampled Seamounts. K. Stocks. 2003.

Biologists, geologists and oceanographers began examining seamounts over 50 years ago. The methods of biological study over this period consist mostly of examining samples from trawls, dredges, traps, and nets. In the last decade, there have been advances in submersible technology that now allow direct exploration of these unique deep sea environments. However, less than 0.1 percent of the world's seamounts have been explored for what species live on them (de Forges et al., 2000; NOAA Ocean Exploration and Research Initiative, 2000). These studies indicate that seamounts function as deep sea "islands" of localized species distributions, dominated by suspension feeders (e.g., corals) growing on rock, in an otherwise flat, low biomass, sediment-covered abyssal plain.

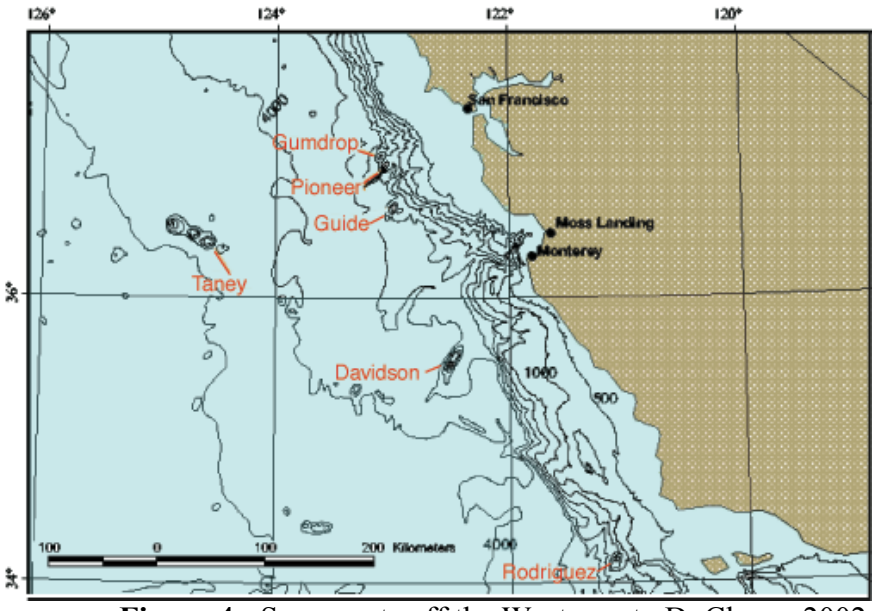


Figure 4: Seamounts off the West coast. D. Clague 2002

Conservation issues relative to seamounts revolve around endemism (species found on only one seamount), harvest, and low resilience of species. Wilson and Kaufman (1987), in their review of seamount biota and biogeography noted that of the 597 invertebrate species reported from 59 seamounts, 92 were novel species and many were endemic (up to 28% on the Vema Seamount).

More recently, de Forges et al. (2000) found in excess of 850 species from seamounts in the Tasman Sea and southeast Coral Sea, of which 29 – 34 % are new to science and potential seamount endemics. Though we know very little about the life history of many seamount species, there are clear cases of species susceptible to over harvest because they are long-lived with slow growth rates, they mature at old ages, their fecundity is low, and their successful new recruits occur only sporadically (Grigg, 1986; Boehlert and Sasaki, 1988; Mace et al.,1990; Boehlert and Mundy, 1993; and Rogers, 1994). Because of low species overlap between seamounts, de Forges et al. (2000) suggest that protection of seamount communities should be undertaken at a local scale; however, there are no seamounts protected by any National Marine Sanctuaries.

2. Davidson Seamount

Location

Davidson Seamount is located 75 miles to the southwest of Monterey, due west of San Simeon, and is one of the largest known seamounts in U.S. waters. It is 26 miles long and 8 miles wide. From base to crest, Davidson Seamount is 7546 feet (2,400 meters) tall; yet, it is still 4,130 feet (1,260 meters) below the sea surface. Davidson Seamount has an atypical seamount shape, having a northeast-trending ridges created by a type of volcanism only recently described (Davis et al., 2002); it last erupted about 12 million years ago. This large geographic feature was the first to be characterized as a "seamount" and was named after the Coast and Geodetic Survey (forerunner to the National Ocean Service) scientist George Davidson.

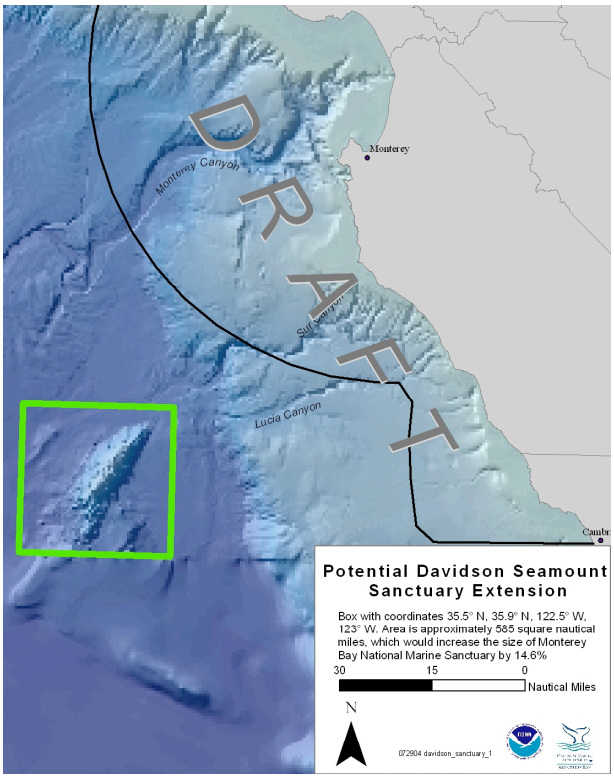
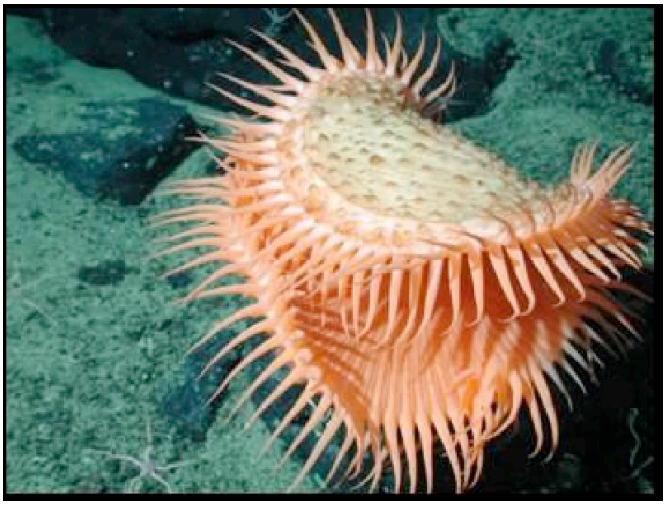


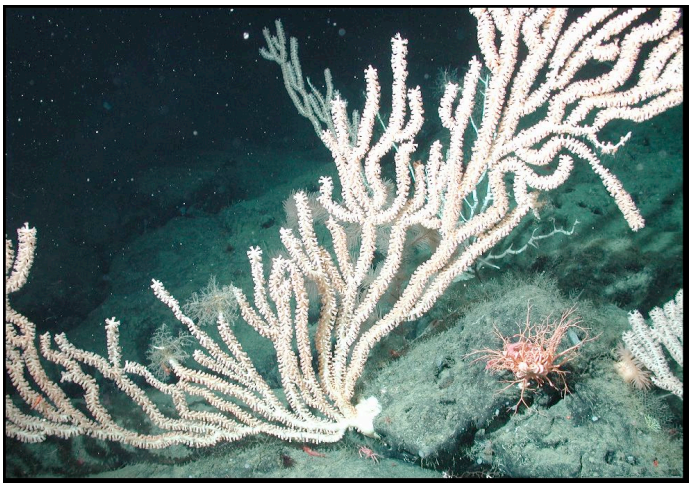
Figure 5: Proposed Davidson Seamount Management Area

Research

The history of research at the Davidson Seamount is relatively limited; however, the research has produced dramatic results and Davidson Seamount is now one of the better studied seamounts in the world. Since first mapped in 1933, there have been ongoing NOAA charting efforts. The U.S. Geological Survey dredged rock samples from the Davidson Seamount in 1978/79. In 1998, the Monterey Bay Aquarium Research Institute (MBARI) completed detailed sidescan and multibeam surveys to precisely map the shape and structure of the seamount. In 2000, MBARI lead a remotely operated vehicle (ROV) survey of the geology of Davidson Seamount, while including biological observations at the sea surface, in the midwater, and on the seamount itself. This same year, there was a Presidential announcement designating the Davidson Seamount as one of three important sites to launch a new era of U.S. undersea exploration.



Venus's flytrap anemone (Hormatiidae) on the slope of the Davidson Seamount (1874 meters). Credit: NOAA/MBARI 2002



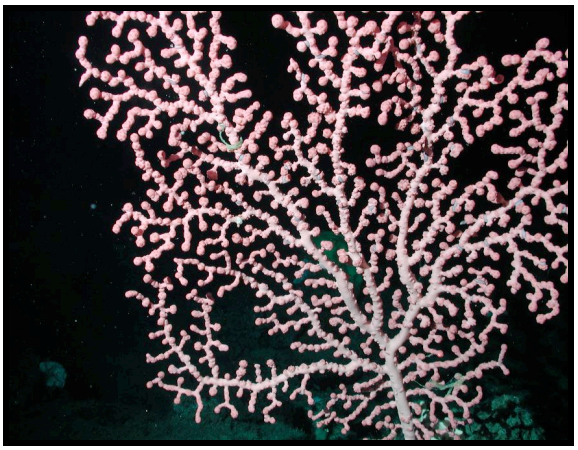
Bamboo coral (*Keratoisis* sp.) on the Davidson Seamount (1455 meters). Coral colony age estimates exceed 200 years (Andrews et al. *In press*). Credit: NOAA/MBARI 2002

The Sanctuary arranged an airplane survey with NOAA Fisheries in 2001 to begin a more detailed characterization of the region's mammals. Finally, in 2002, the MBNMS led another ROV expedition to explore the seamount at all depths with a primary purpose of characterizing species patterns of distribution and abundance. This last cruise received perhaps unparalleled national media attention for central California marine science. The BBC is working with MBARI and other partners on a follow-up cruise to feature Davidson Seamount's spectacular benthic organisms to an international audience. The Naval Postgraduate School has placed scientific instruments through the 1990's on the Davidson Seamount to measure currents between this offshore location and the coast.

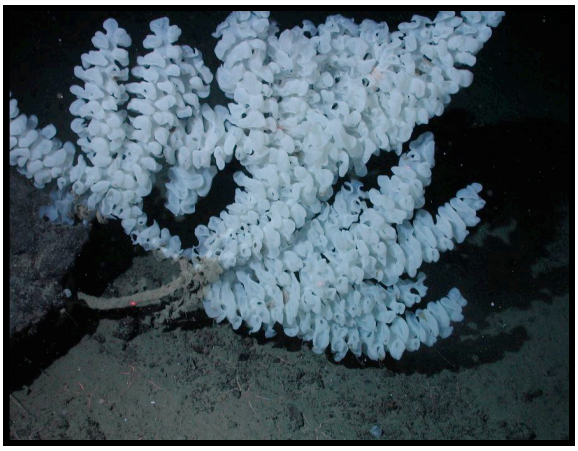
Biology

Species associated with the Davidson Seamount can be divided into habitats including: the sea surface habitat (birds in flight and sea surface), the midwater habitat (0 – 1,250 meters below sea surface), the crest habitat (1,250 – 1,500 meters), the slope habitat (1,500 – 2,500 meters), and the base habitat (2,500 – 3,500 meters) (DeVogelaere et al., in prep.).

The surface habitat hosts a variety of seabirds, marine mammals, and surface fishes, including albatross, shearwaters, jaegers, sperm whales, killer whales, albacore tuna, and ocean sunfish. At this time, there is no published evidence that the species composition in this habitat is different than adjacent areas without a seamount below, though in some years the Davidson Seamount may enhance albacore fishing (Tom Roff, pers. com.). The organisms in the midwater habitat have a patchy distribution with marine snow, organic matter that continually rains down from the sea surface, most likely providing an important food source for deep sea animals.



Bubblegum coral (*Paragorgia* sp.) 2.5 meters (8 feet) in height were not uncommon at the crest of the Davidson Seamount (1257 meters). Credit: NOAA/MBARI 2002



White stalked sponge on the Davidson Seamount (2563 meters). Credit: NOAA/MBARI 2002

Swimming worms, an undescribed mollusk, and a recently described, basketball sized, red jellyfish (Matsumoto et al., 2003) have been seen above Davidson Seamount. The crest habitat is the most diverse, including large gorgonian coral (*Paragorgia* sp.) forests, vast sponge fields (many undescribed species), crabs, deep-sea fishes, shrimp, and basket stars. The slope habitat is composed of cobble and rocky areas interspersed with areas of ash and sediment. This area hosts a diverse assemblage of sessile invertebrates and rare deep-sea fishes. The halosaur (*Aldrovandia* sp.), an eel-like species of fish, has never been recorded in the California Current until the MBNMS's 2002 expedition to the Davidson Seamount. The base habitat is the interface between rocky outcrops and the deep soft bottom. Species here are similar looking to their relatives in the nearshore, including sea cucumbers, urchins, anemones, and sea stars.

B. Purpose and Need for Action

The Davidson Seamount requires protection from the take or other injury to benthic organisms or those living near the sea floor because of the following qualities and threats:

1. Qualities

CONSERVATION

- Vulnerability of resource to damage: long-lived species; dominated by large fragile, slow-growing organisms; long recovery time if impacted.
- Special characteristics of resource: The area is pristine; it has large microhabitats of old corals and sponges; and it has relatively high numbers of rare and unidentified benthic species.

ECOLOGICAL

- Biologically special: Davidson Seamount has previously undiscovered species and species assemblages (large, adjacent, patches of corals and sponges); there is an opportunity to discover unique associations (and other ecological processes) between

species. The high biological diversity of these assemblages is not found on other central California seamounts (i.e., Guide, Pioneer, and Gumdrop).

- Geographically special: Davidson Seamount is located in the California Current, which likely provides a larger flux of carbon (food) to the sessile organisms on the seamount surface relative to a majority of other seamounts in the Pacific.
- Physically special: Davidson Seamount is one of the largest seamounts in US waters. It is structurally more complex with northeast-tending ridges. It may have unique links to the nearby Partington and Monterey submarine canyons.

SCIENTIFIC

- With high-resolution mapping and 17 long/detailed ROV dives, the Davidson Seamount is one of the best described seamounts in the world.
- Rare or undescribed species (high diversity).
- Proximity to scientific research institutions makes the Davidson Seamount relatively accessible.
- Proximity to fishing fleets would facilitate cooperative research using these vessels.

EDUCATIONAL

- Proximity to the Monterey Bay Aquarium and other education institutions would provide excellent educational opportunities (e.g., an education display on seamounts). The proximity of education and research institutions in the Monterey Bay region facilitates interdisciplinary collaborations that would enhance research and education.
- The National Marine Sanctuary Program has the best developed education programs in NOAA, providing an opportunity to educate the public about seamounts as well as cold water corals and sponges

AESTHETIC

- Davidson Seamount has clearly captivated the imagination of the public (see media and outreach product list from the May 2002 expedition: national news, BBC, newspaper articles, series of talks, new NOAA visitor center film, NOAA CD, NOS annual accomplishments, 140,000 hits per day web site, etc.).
- Charismatic issue: visually exciting; charismatic creatures like unique fish, large corals, and odd-looking invertebrates; aesthetic qualities of the seafloor are high relative to the rest of the Central California region.

2. Threats

There are a variety of human threats to the Davidson Seamount. The top of the seamount is too deep for current fish trawling technology, however, technological advances may soon make fishing at that depth commercially viable. Additionally, benthic fish density is very low and the species seen to date are not commercially desirable (Cailliet, pers. com. Monterey, CA.). The top of the seamount appears nearly pristine because of the abundance of large, fragile species (e.g., corals greater than 2.5 meters tall and vast fields of sponges) and an apparently physically undisturbed seafloor. The existing albacore tuna and swordfish/shark fisheries operate in the top 50 meters of water, more than a thousand meters above the seamount (NMFS, 2000; Starr et al., 2002). Therefore, threats from fishing are relatively remote; however, future fishing efforts could target the seamount. More immediate threats include the cumulative effects of research

and of bioprospecting. Collection and bioprospecting could be effectively and efficiently managed by the Sanctuary's permitting system.

Cumulative research collecting of long-live species
Where there are limited populations of slow-growing species, research collection can be detrimental. Over the last two years, there has been increased worldwide interest in studying deep-sea corals (NOAA) such as the large pink, *Paragorgia*, found on the Davidson Seamount and they are often collected (in prep; Nature). This problem is exacerbated on seamounts where there is a high degree of endemism and Davidson Seamount has at least several taxa that are slow-growing and rare. Research is critical to understanding and managing ecosystems, so appropriate scientific collecting is often allowed with permits. Researchers would be required to submit a permit application that describes their project and its value. If appropriate the MBNMS would issue a permit, one that contains conditions designed to ensure strategic use of the resources that minimizes adverse impacts.

New technologies to harvest from the seabed
Harvesting from the Davidson Seamount is not a known, current commercial activity. With new discoveries of precious corals or other commercial species, in concert with more effective harvest technologies, commercial harvest at the Davidson Seamount could quickly cause severe impacts before mitigating regulations could be enacted. The concerns relative to impacts to the Davidson Seamount are largely for protecting a fragile area before it is severely impacted.

Marine debris/dumping
Pollutants have been detected in the form of DDT in sediments near the seamount base and trash (e.g., bottles, cans, broom, newspapers, shades, curtain) discarded from the sea surface have been found on the seamount (DeVogelaere et al., in prep).

Bioprospecting
Some groups of organisms found on the Davidson Seamount have been targeted in other areas of the world for developing medicines. Discovering medicinal uses for natural products can be important for enhancing human health services. However, this type of activity has overexploited some seamounts. There has been a preliminary bioassay of one yellow sponge from Davidson Seamount.

Inadequacy of Existing Protection Measures
There are several federal management agencies responsible for some activities that may occur at the Davidson Seamount. NOAA Fisheries protects marine mammals through the Marine Mammal Protection Act and regulates fisheries, such as albacore, through the Magnuson-Stevens Fishery Conservation and Management Act. The Minerals Management Service addresses potential oil, gas, and mineral extraction; and the U.S. Coast Guard enforces ocean dumping laws. However, as was the case when the MBNMS was designated in 1992, there is currently no comprehensive protection and management of organisms on the seamount or the surrounding ecosystem. Moreover, there are no coordinated education or research programs addressing Davidson Seamount issues.

3. Manageability and Enforcement

The Davidson Seamount is a distinct geographic unit that is easily recognized. Though deep and relatively far from shore, it is relatively accessible compared to other seamounts. There are many regional research and fishing vessels in the region that can access the water above Davidson Seamount. Moreover, one of the few institutions in the world with equipment able to dive the depths of Davidson Seamount, MBARI, is located adjacent to and a regular partner of the MBNMS. NOAA has airplanes and large research vessels that are available for use by the MBNMS to survey and monitor the Davidson Seamount. At-sea enforcement of regulations would admittedly be challenging for this offshore area.

C. Goals and Objectives for Incorporation of Davidson Seamount into the Monterey Bay National Marine Sanctuary

The following are the management goals and objectives for incorporating the Davidson Seamount into the Monterey Bay National Marine Sanctuary. The draft regulations that the PFMC prepares will be evaluated on the basis of to what degree they help achieve these goals and objectives.

Goals:

- To maintain the natural biological communities on the Davidson Seamount, and to protect, and, where appropriate, restore and enhance its natural habitats, populations, and ecological processes;

- To provide authority for comprehensive and coordinated conservation and management of this area, and activities affecting it, in a manner which complements existing regulatory authorities;

- To enhance public awareness, understanding and appreciation of the Davidson Seamount area;

- To support, promote, and coordinate appropriate scientific research on, and long-term monitoring of, the resources of the Davidson Seamount area;

Objectives:
The following objectives for the inclusion of the Davidson Seamount reflect those identified for the MBNMS at the time of Sanctuary designation as well as the unique characteristics of the seamount.

Resource Protection
The highest priority management goal for the Davidson Seamount is the protection of its marine environment, resources and qualities.

- Coordinate policies and procedures among the agencies sharing responsibility for protection and management of resources;

- Develop an effective and coordinated program for the enforcement of Sanctuary regulations;

- Promote public awareness of, and voluntary compliance with, Sanctuary regulations and objectives, through education and interpretive programs stressing resource protection;

- Ensure that the water quality of the Sanctuary is maintained at a level consonant with Sanctuary designation;

- Ensure that the appropriate management agency incorporates research results and scientific data into effective resource protection strategies;

- Reduce threats to Sanctuary resources and qualities.

Research

The purpose of Sanctuary research activities on the Davidson Seamount would be to improve understanding of the area, its resources and qualities, to resolve specific management problems, and to coordinate and facilitate information flow between the various research institutions, agencies and organizations. A major emphasis of the research program would be to encourage studies that investigate the natural processes on the Seamount. Research results would be used in education programs for visitors and others interested in the Sanctuary, as well as for resource protection. The strategies to be employed in the research program would be to:

- Establish a framework and procedures for administering research to ensure that research projects are responsive to management concerns and that results contribute to improved management of the Davidson Seamount area;

- Incorporate research results into the interpretive/education program in a format useful for the general public;

- Focus and coordinate data collection efforts on the physical, chemical, geological and biological oceanography of the Seamount; Initiate a monitoring program to assess environmental changes as they occur due to natural and human processes;

- Identify the range of effects on the Seamount that would result from predicted changes in human activity or natural phenomena;

- Encourage information exchange among all the organizations and agencies undertaking management-related research in the area to promote more informed management.

Education

The goals of the education program regarding the Davidson Seamount would be directed to improving public awareness and understanding of its significance and the need to protect its resources and qualities. The management objectives designed to meet this goal would be to:

- Provide the public with information on the Davidson Seamount and these goals and

objectives, with an emphasis on the need to use the resources on the seamount wisely to ensure their long-term viability; Broaden support for management of the Davidson Seamount area by offering programs suited to visitors with a range of diverse interests; Provide for public involvement by encouraging feedback on the effectiveness of education programs and collaborate with other organizations to provide interpretive services, including extension and outreach programs and other volunteer projects complementary to the Sanctuary program;

- Incorporate research results into the interpretive/education program in a format useful for the general public; and

- Use Davidson Seamount as the only seamount in the Sanctuary Program to create public awareness of the entire nation-wide Sanctuary Program, its purposes and intent, and the role of the MBNMS as part of a larger system.

D. Alternative Actions Considered

The following alternatives have been considered in order to address resource protection concerns on and above Davidson Seamount. The alternative actions were developed through public comment, the Davidson Seamount multi-stakeholder workgroup, discussions with the MBNMS advisory Council, PFMC staff, and NMFS Southwest Region. NMSP is requesting that PFMC draft sanctuary fishing regulations to implement NMSP's preferred alternative. Regulations resulting from the 304(a)(5) process would later be incorporated into an Environmental Impact Statement that considers Sanctuary designation and boundary configurations for the seamount.

1. Prohibit All Fishing Below 3000 Feet of the Sea Surface within the Davidson Seamount Area - (Preferred Alternative)

Activities
Under this alternative, a public awareness campaign would be initiated to educate users and the general public about the new regulations. The MBNMS and its partners would also pursue monitoring and enforcement activities.

Scientific Research
Scientific research is critical for understanding ecosystem function and to inform resource management. To date, research is the most common human activity known to "use" the Seamount itself. Research at the Davidson Seamount could be enhanced through a Sanctuary research program. However, research in Sanctuaries can also be appropriately limited through permit processes that consider ecosystem protection by, for example, incorporation of conditions on techniques, frequency and amounts of collection to minimize impacts.

Bioprospecting
Similar to scientific research the bioprospecting collection of coral or other resources could be controlled through the MBNMS permitting system. This would ensure that any collection allowed of these resources is conducted appropriately and in a strategic manner. Particularly

because this possibility exists, any negative socio-economic impacts on any potential future bioprospectors are extremely speculative.

Conservation Benefits

This alternative would protect the vulnerable, long-lived, fragile and slow-growing species, which have long recovery times if impacted. It would also safeguard previously undiscovered species and species assemblages (large, adjacent, patches of corals and sponges). The restrictions would also protect the opportunity to discover unique species associations or ecological processes by keeping them undisturbed. Regulations would also constitute an educational tool to educate the public and fishermen about the resources on the Davidson Seamount. Protection of the long-lived fragile organisms on the seamount would continue to provide public outreach opportunities in the form of future media coverage of this pristine and unique environment. This alternative also provides a buffer of 1000 feet between the top of the seamount and any fishing activities. This buffer protects the ecological communities that have direct relationships with the biogenic habitat on the seamount but can be found in the water column immediately above the seamount. Prohibiting bottom fishing would also reduce the threat posed by lost gear and marine debris that can have lasting impacts to organisms on the seamount.

Socioeconomic Impacts to Fishing

The proposed fishing regulation would prohibit all fishing below 3,000 feet of the sea surface in the Davidson seamount area (see Figure 6). This regulation would prohibit the groundfish trawl fishery and any other fisheries using bottom gear (such as traps, pots, or set lines) from operating within the Davidson Seamount area. To estimate the impacts from the proposed regulation, CDFG landing receipts for the two reporting blocks straddled by the seamount (No's1036 and 568) were analyzed. The fishing intensity over the seamount was assessed using CDFG trawl logbook data.

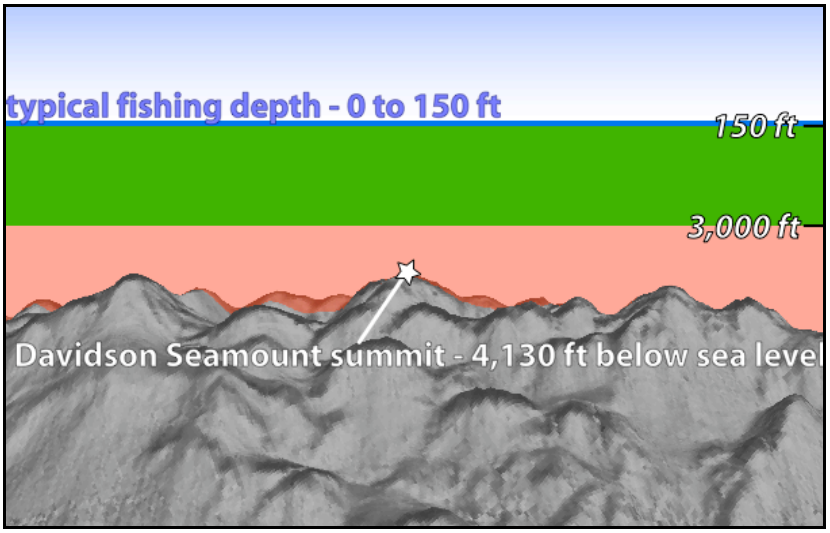


Figure 6: The proposed regulation would address an area far below the uppermost 150 feet where current pelagic fisheries primarily operate

Summarizing the landing receipts revealed that, between 1992 and 2002 (the most recent year available at the time of analysis), practically 100% of landings reported in the two blocks came from the larger one, No. 1036; It is important to note that the seamount occupies only 2% of the area of block 1036, however, to be comprehensive, landings for the entire block are described below.

Over the 11 years analyzed, total landings from the two blocks show a decreasing trend, from around 11 million pounds in 1992 to just over 2.5 million in 2002.

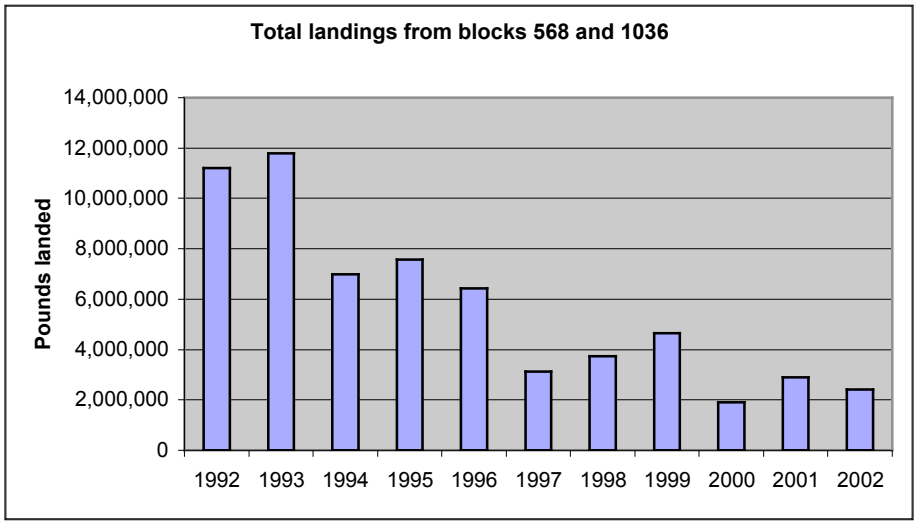


Figure 7: Total Landings in the CDFG Blocks Encompassing the Davidson Seamount Area

Of those landings, the following 14 species make up between 92% and 97% of total landings each year: albacore, chinook, dungeness crab, dover sole, halibut, lingcod, petrale sole, rockfish, sablefish, shrimp, sharks, swordfish, thornyheads, and squid. Of these species, the pelagic species fluctuate quite significantly over the time period analyzed, with albacore landings spiking at 1.6 million pounds in 2001, and squid landings varying from zero to 1.8 million in 1999. These fisheries utilize pelagic gear such as troll gears or purse seines, which would not be impacted by the proposed management measure.

More significantly for the management alternative under consideration, a group of groundfish species that are managed as a management complex, the so-called DTS complex of dover sole, thornyheads and sablefish, accounts for between 40% and 65% of total landings, for all years other than the pelagic spikes of 1999 and 2001. In the most recent year available, 2002, the DTS complex accounted for 45% of total landings from the two blocks that straddle the seamount.

If these landings were spread evenly over the blocks, some proportion of these landings would originate directly over the seamount, and thus would potentially be reduced by the proposed regulation. However, this is not the case. First, there are significant accuracy problems with the landing receipts, which are filled out by processors. Landings data tend to misrepresent the

location of catches, and thus need to be compared to other data sets that describe the various fisheries. The DTS complex is fished with benthic trawl gear, and the groundfish fishery is required to record set and haul points in a logbook system administered by the CDFG. Coast wide, there is a good match between landing receipts and logbooks in terms of poundage recorded, but poor overlap in terms of spatial specificity of the records.

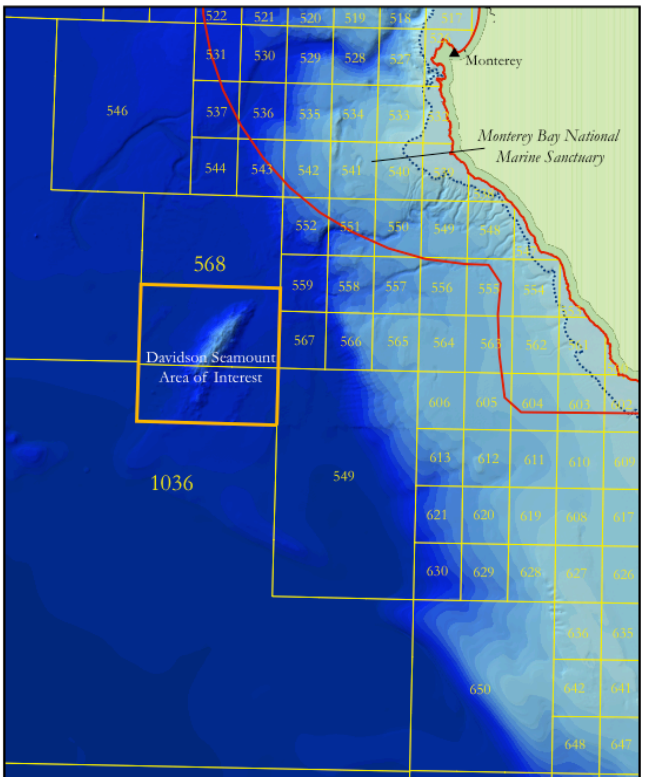


Figure 8: Location of Davidson Seamount Area over CDFG Reporting Blocks 568 and 1036

Second, from the analysis of trawl logbooks from 1997-2002 it is apparent that very little actual trawl activity takes place in the area of the seamount. Of the tow set and haulpoints recorded in the logbooks, only two (which are potentially errant) cross the area of interest in the five years analyzed. Looking at the depths recorded in the logbooks further corroborates the absence of trawling over the seamount. The mean depth of block 1036 is 10,496 feet, with a minimum depth of 5,359 feet and a maximum of 15,396 feet. From the trawl logbooks, however, which record average tow depth, it is apparent that there are no tows occurring directly on the seamount. For the years 1997-2002, the mean average tow depth recorded in logbooks ranges from 735 to 1122 feet. Again, the summit of the seamount is 4,101 feet below the surface, further indicating that groundfish fishing activity takes place well outside the depth of the seamount.

Given that the fishery activity reported for the area under consideration appears to be taking place in depths less than the seamount, the proposed preferred management alternatives likely to have little adverse impact.

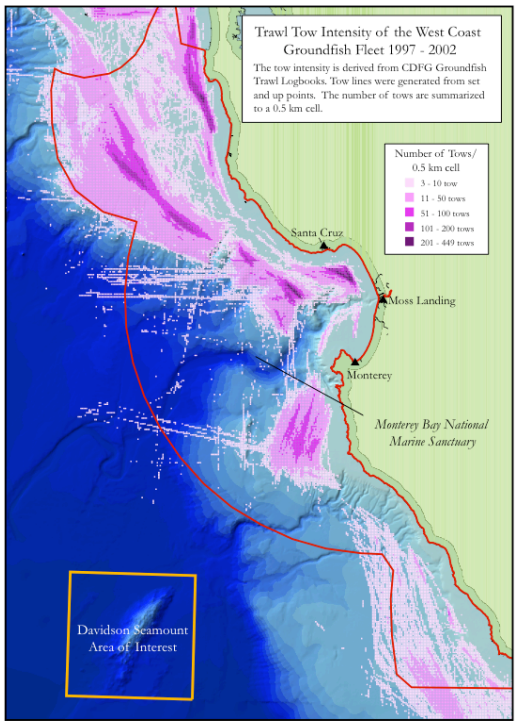


Figure 9: Lack of Trawling Effort over the Davidson Seamount in .5km blocks

Enforcement

The preferred alternative would allow all fishing activities within 3000 feet of the sea surface to continue and would have no impact on current fishing activities. Prohibiting fishing below 3000 feet would pose enforcement challenges in that it would be difficult for enforcement personnel to determine from a distance what depth a vessel is fishing at. This is in addition to the challenges associated with the remoteness of the location and limited enforcement capabilities. However, based on effort and landings data along with communications with fishermen, NOAA enforcement staff are sufficiently confident that only pelagic species are being targeted. The fishing regulations that the Council may draft to implement the preferred alternative would be coupled with other sanctuary regulations that would prohibit the possession of biological resources taken from below 3000 feet of the Davidson Seamount area, and would complement enforcement efforts.

For the reasons listed above, this action represents the preferred alternative. Consistent with this, the following language is intended to provide a regulatory model for the PFMC that would prohibit all fishing activities below 3000 feet of the sea surface within the Davidson Seamount Area:

Fishing is prohibited at depths greater than 3000 feet below the sea surface within the Davidson Seamount Area as defined by the area bound by the coordinates West: 123°W; East: 122.5°W; North: 35.9°N; South: 35.5°N.

2. Prohibit All Fishing Below 200 Feet of the Sea Surface Within the Davidson Seamount Area

Activities
Under this alternative, a public awareness campaign would be initiated to educate the public and users about the new regulations. The MBNMS and its partners would also pursue monitoring and enforcement activities.

Conservation Benefits
This alternative has greater conservation benefits than the preferred alternative. The distinguishing feature of this alternative is its protection of the communities in the water column above the seamount. Additionally, prohibiting all fishing below 200 feet would further reduce the threat posed by lost gear and provides needed protection for a greater proportion of the midwater organisms that may have ecological linkages with the seamount.

Socioeconomic Impacts to Fishing
This alternative would not allow for the development of any future mid-water trawl fishery, and provides a small buffer between the existing fishing activities and the protected area. There is therefore a potentially greater socioeconomic impact associated with this alternative as compared to the preferred alternative.

Enforcement
Enforcement challenges would be similar to those associated with the preferred alternative. However, under this action, enforcement personnel would not be as able to rely on the type of gear being utilized as an indication of the depth being fished. Under the preferred alternative, enforcement personnel would primarily be concerned with trawlers in the area with the ability to fish below 3000 feet. Under this alternative, virtually any fishing vessel could be in violation. Additionally, species taken in violation of the preferred alternative (from below 3000 feet) would be physically more distinguishable compared to species taken in violation of this alternative.

For the above reasons, particularly because this option has a greater potential for interaction with fishing activities, this was not selected as the preferred alternative.

3. Prohibit All Fishing Within 100 Feet of the Submerged Lands Within the Davidson Seamount Area

Activities
Under this alternative, a public awareness campaign would be initiated to educate the public and users about the new regulations. The MBNMS and its partners would also pursue monitoring and enforcement activities.

Conservation Benefits
The conservation benefits of this alternative are similar to those of the preferred alternative but fewer. The distinguishing feature of this alternative is that it only provides a buffer of 100 feet between the top of the seamount and any fishing activities as opposed to 1000 feet. As

discussed, this buffer is critical to protecting the ecological communities that have direct relationships with the biogenic habitat on the seamount but can be found in the water column immediately above the seamount. Here again, prohibiting bottom fishing would also reduce the threat posed by lost gear and marine debris, which can have lasting impacts to organisms on the seamount. A larger buffer reduces the potential impact from lost fishing gear and provides needed protection for a greater proportion of the benthopelagic and midwater organisms that have direct ecological linkages with the seamount.

Socioeconomic Impacts to Fishing
There is no substantial difference between the socioeconomic impacts of this alternative as compared to the preferred alternative. As discussed, existing fisheries take place within 150 feet of the sea surface and whether the proposed regulation begins at 3000 feet or 3900 feet would have no effect on these fisheries.

Enforcement
There is a significant difference in the enforceability of this alternative as compared with the preferred alternative. It is easier to comply with and enforce a regulation that is based solely on depth and does not depend on the bathymetry below. In order to comply a fisherman must know not only how deep they are fishing but also how close they are to the bottom. Similarly, an enforcement officer would have to be aware of two variables as opposed to one.

For the above reasons, particularly that this option does not provide adequate resource protection, this was not selected as the preferred alternative.

4. Prohibit All Fishing on the Submerged Lands Within the Davidson Seamount Area

Activities
Under this alternative a public awareness campaign would be initiated to educate the public and users about the new regulations. The MBNMS and its partners would also pursue monitoring and enforcement activities.

Conservation Benefits
This alternative would provide many of the same protections discussed for the preceding alternatives. However, it would not provide a buffer between the top of the seamount and any fishing activities. This buffer is critical to protecting the ecological communities that have direct relationships with the biogenic habitat on the seamount but can be found in the water column immediately above the seamount.

Socioeconomic Impacts to Fishing
There is no substantial difference between the socioeconomic impacts of this alternative as compared to the preferred alternative. As discussed, existing fisheries take place within 150 feet of the sea surface and whether the proposed regulation begins at 3000 feet or begins at the top of the seamount would have no effect on these fisheries.

Enforcement
There is no significant difference in the enforceability of this alternative as compared with the

preferred alternative.

For these reasons, particularly because this alternative does not provide adequate resource protection, this was not selected as the preferred alternative.

5. No Action Alternative

Under this alternative no new regulation would be promulgated to address fishing in the Davidson Seamount area, which would then be protected only by existing Sanctuary regulations.

Biological Benefits

The mission of the NMSP is to comprehensively protect and manage marine areas of special national significance and thereby protect their ecological and cultural integrity for the benefit of current and future generations. In carrying out this mission, NOAA uses ecologically sound principles of resource conservation to develop and implement stewardship, education and research programs that foster public understanding, support and participation. Failing to protect the fragile and rare resources on the Davidson Seamount would not satisfy the mandates of the National Marine Sanctuaries Act.

Socioeconomic Impacts to Fishing

There is no substantial difference between the socioeconomic impact of the preferred alternative and the status quo. The proposed regulatory action would have no effect on existing fisheries.

Enforcement

There would be no enforcement burden without a regulation in place.

For the reason that it does not provide adequate resource protection, this was not selected as the preferred alternative.

II. CORDELL BANK

In accordance with section 304(a)(5) of the NMSA, Cordell Bank National Marine Sanctuary is providing the Pacific Fishery Management Council with the opportunity to draft sanctuary regulations that meet the goals and objectives for the preferred alternative listed below (see Section D., Preferred Alternative).

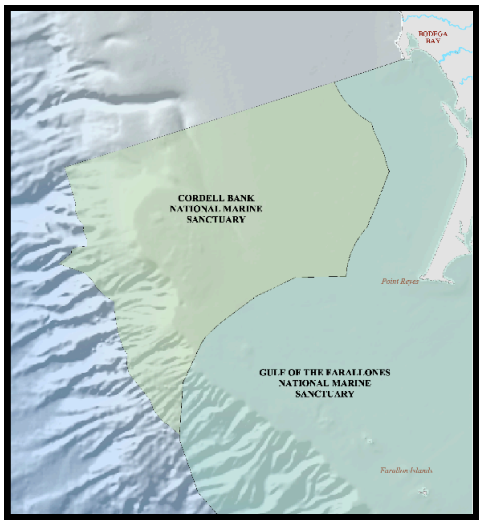


Figure 10: Boundaries of Cordell Bank National Marine Sanctuary

A. **Background**

1. Location

Cordell Bank National Marine Sanctuary (CBNMS) protects an area of 526 square miles (397 square nautical miles) off the northern California coast. The main feature of the sanctuary is Cordell Bank, an offshore granite bank emerging from the soft sediments of the continental shelf, about 45 nautical miles (nm) northwest of the Golden Gate Bridge and 20 nm west of the Point Reyes lighthouse. CBNMS is entirely offshore and shares its southern and eastern boundary with the Gulf of the Farallones National Marine

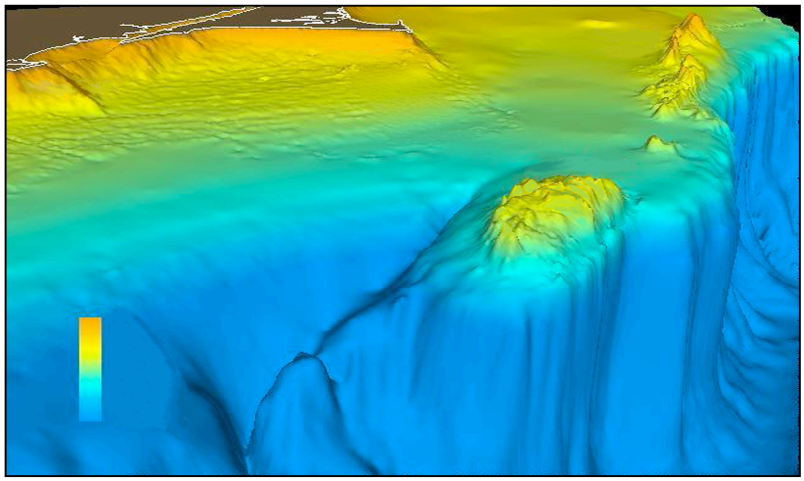


Figure 11: Bathymetric Image of Cordell Bank

Sanctuary. The CBNMS eastern boundary is six miles from shore and the western boundary is the 1000 fathom isobath on the edge of the continental slope. The combination of oceanic conditions and undersea topography supports a rich and diverse marine community including resident and migratory marine mammals, seabirds, fishes, and invertebrates proliferating on the

Bank and surrounding water column.

The Bank itself is roughly elliptical, and within the 50 fathom depth contour it is 9.5 miles long and 4.5 miles wide and rests on a sea floor area of 24.0 square miles. Cordell Bank is the only significant bathymetric feature on the northern California continental shelf. The continental shelf between the Bank and headlands at Point Reyes has an average depth of 60 fathoms. To the west, the bottom falls quickly down the continental slope to the abyssal plain a few miles away.

CBNMS is located in one of the world's four major coastal upwelling systems. The combination of oceanic conditions and undersea topography provides for a highly productive environment in a discrete, well-defined area (Schmieder, 1982a). The vertical relief and hard substrate of the Bank provide benthic habitat with near-shore characteristics in an open ocean environment 20 nm from shore.

2. Geology

Two distinctive geologic features characterize CBNMS: the shallow granitic Cordell Bank and the surrounding soft bottom of the continental shelf and slope.

Cordell Bank is composed of a granite block that was created as part of the southern Sierra Nevada range some 93 million years ago. The bank is one of the few offshore areas where the granite block emerges from the newer sediments that make up most of the continental shelf. The bank is approximately 4.5 miles wide by 9.5 miles long and consists of a diverse assemblage of habitat types. The eastern side of the Bank is characterized by a gradual transition from the sandy sediments of the continental shelf through cobble sand areas up on to consolidated reef. The northern and western side of the Bank is steeper with a dramatic transition from the soft mud of the continental shelf to steep sided granite walls and boulder fields on the bank. Though generalizations can be used to describe large-scale geomorphology in different areas of the bank, habitat types are very heterogeneous on a smaller scale. For example, in one fifteen minute transect it is not uncommon to have sand, cobble, boulder and reef habitats all represented in some proportion along the transect. This diversity of habitat can be found on most areas of the Bank (habitat figure from delta work). Jagged ridges and pinnacles rise abruptly in different areas of the Bank and reach to within 140 to120 feet of the sea surface. In many places, the sides of the ridges and pinnacles are extremely steep, often with slopes greater than 80 degrees (Schmieder, 1984a). Six nautical miles to the west of the Bank, along the sanctuary boundary, the continental slope drops steeply to 6,000 feet (1000 fathoms) and more.

The ocean bottom on the continental shelf and slope around the Bank and within the Sanctuary is chiefly composed of mud and sand deposits. Deposits of undifferentiated mud and sand extend in a plume to the south and a fan to the east of Cordell Bank. To the north and western boundary, along the Farallon escarpment, the continental shelf is entirely made up of fine sand deposits.

3. Climate and Oceanography

The calendar year at Cordell Bank can be broken into three oceanographic seasons: upwelling season, relaxation season, and winter storm season. The upwelling season typically begins with

the spring transition, characterized by strong persistent winds from the northwest. This usually occurs sometime in late February or early March, and is the start of the annual productivity cycle along northern and central California. During this season, upwelling driven by winds from the northwest alternate with periods of calm. These winds generally begin to subside by late July. August through mid-November is the relaxation season. During this time, winds are mostly light and variable, and the seas can be calm for a week or two at a time. This changes abruptly with the arrival of the first winter storms from the Gulf of Alaska. From late November through early February, winter storms create large waves and strong winds along the coast. Ocean conditions can be treacherous all year, but especially during winter storms.

Physical processes operating on different temporal and spatial scales drive hydrodynamics on and around the bank. Cordell Bank lies in the path of the California Current, one of four major eastern boundary currents in the world. Current-topography interactions on banks and seamounts include semi-stationary eddies (Taylor columns), internal wave reflection, tidally induced currents eddies, and trapped waves. The relief and position of Cordell Bank also drives localized upwelling as the wind driven south flowing current encounters the granitic relief of Cordell Bank. This localized flow moving up and over the bank, delivers food to the Bank ecosystem and new recruits to populations if larvae survive the gauntlet of predators waiting their arrival.

The prevailing California Current flows southward along the coast while the upwelling of nutrient-rich, deep ocean waters stimulate the growth of planktonic organisms. These nutrients, combined with high light penetration in Bank waters, and the wide depth ranges in the vicinity, have led to a unique association of sessile, subtidal and oceanic species. Some species at Cordell Bank are deep-water forms, but most are known from nearshore waters and some are even found in the intertidal zone. Most of the flora and fauna live in densely packed masses near the tops of the ridges and pinnacles. However, since the species living on the Bank do not have the same environmental requirements or tolerances, there is a marked variation from one depth to another in the distribution of organisms.

4. Marine Birds

The waters around Cordell Bank provide critical foraging habitat for many species of seabirds. Seabird density over Cordell Bank can be among the highest of any area in central and northern California. Fifty-nine seabird species have been identified feeding in or near the sanctuary. The composition of seabirds found at Cordell Bank is a mix of local breeding birds and highly migratory, open-ocean species. While the local representatives use the nearby Farallon Islands and Point Reyes areas to nest, some migrants nest thousands of miles away. A recent study using radio tags documented that Black-footed Albatross nesting in the northwest Hawaiian Islands were “commuting” to Cordell Bank waters to forage before returning to feed chicks on their nests on Midway Atoll.

Other migratory species use the productive waters around the bank as a stopover on their annual migration route. Hundreds of thousands of Sooty Shearwaters can be seen in summer and fall when they are migrating through the sanctuary. Sanctuary waters are equally important to local breeders. Most of the worlds’ small population of Ashy Storm-petrels, which nest on Southeast Farallon Island, can be seen on the water near the Bank. More than 20,000 Cassin’s Auklets have been counted in a single day. Other common sanctuary species include Common Murres, several

species of Storm-petrels and shearwaters, Rhinoceros Auklets, Phalaropes, Northern Fulmars and many species of gulls. These birds are attracted to high concentrations of food that accumulates around Cordell Bank. Concentrations of krill and juvenile rockfish are directly linked with reproductive success of nesting birds on the Farallon Islands. Years with high juvenile rockfish recruitment were positively correlated with increased reproductive success. Reduced egg production was observed during warm water years when rockfish recruitment failed.

5. Marine Mammals

Twenty-six species of marine mammals (a combination of resident and migratory species) have been observed within the sanctuary. Gray whales pass the Bank on their annual migrations between Arctic feeding grounds and Mexican breeding areas. Blue and humpback whales migrate to the sanctuary in summer months to feed on abundant krill and fish. Populations of large cetaceans continue to rebound with protection from commercial harvest.

The Dall's porpoise is one of the most frequently sighted marine mammals in the sanctuary, along with seasonal sightings of humpback and blue whales. Individuals of all species use the sanctuary as a destination feeding ground. The harbor porpoise, a species widely distributed in coastal waters but rarely seen offshore, is regularly observed within the sanctuary's shallow areas. Pacific white-sided dolphins and northern right whale dolphins are abundant. Other cetaceans observed in the sanctuary include Risso's dolphins and killer whales.

The California sea lion, the most abundant pinniped in California waters, has been observed in CBNMS more frequently and in greater numbers than other pinnipeds. The northern fur seal is also abundant in the area in late fall and winter (most of them use summer breeding grounds in the Channel Islands). Stellar sea lions have decreased drastically in California in recent years, but Cordell Bank remains a feeding area for this species, possibly because of the abundance of rockfish and sardines around the bank. Nearby rookeries include Año Nuevo Islands and the Farallon Islands. The sea lions' winter haul-out grounds include Point Reyes and offshore rocks along the Sonoma County coast.

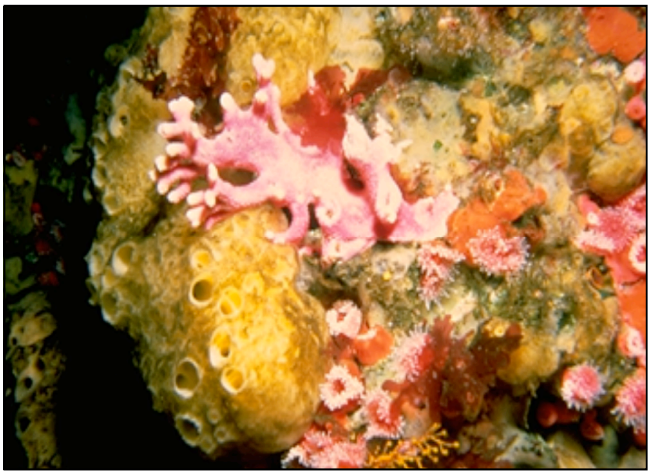
6. Fishes

The structure and position of Cordell Bank make it ideal habitat for many species of fish. More than 180 species of fish have been identified from CBNMS. Many of these species have pelagic larval stages and likely encounter Cordell Bank as the first suitable habitat to settle. The Bank provides critical habitat for all life stages - young of the year, sub-adult and adult rockfishes. Many of the 58 species of rockfish (*Sebastes* spp.) can be found at all depths and habitats on and around the Bank. Mid-water schooling species including blue, yellowtail, widow, and squarespot rockfish aggregate over shallower, reef areas around the bank. Rosy rockfish are commonly found in shallow reeftop habitat. Canary, bocaccio, vermilion, yelloweye and cowcod rockfish are found in the deeper reef and boulder areas. Splitnose, stripetail and greenstripe rockfish can be found on the soft sediment areas adjacent to the rocky bank. And greenspotted rockfish are good indicators of a sand rock interface. Lingcod are found in all areas of the bank and move up onto shallow reef areas on the bank to spawn in winter. The sand, cobble habitat on the bank is an important recruitment area for young of year lingcod. Chilipepper rockfish are commonly caught by fishermen around the Bank, but rarely observed from the submersible. Many species of flatfish use the soft-bottom habitat around the Bank

including sanddabs, English sole, dover sole, and rex sole. Albacore and salmon frequent the sanctuary on a seasonal basis, as do ocean sunfish and blue sharks. Many fishes and cetaceans feed on lanternfishes, which migrate nightly into shallow surface layers from deeper daytime haunts. The recovery of Pacific sardine populations is apparent in the waters surrounding Cordell Bank.

7. Benthic Organisms

An abundant cover of benthic organisms lives on the upper rock surfaces of Cordell Bank. The constant food supply washing the bank combined with a hard substrate for attachment provides ideal conditions that support a rich assemblage of benthic invertebrates. Space is the limiting factor on the upper pinnacles and ridges of Cordell Bank. Ridges are densely covered with sponges, anemones, hydrocorals, hydroids, tunicates, and scattered crabs, holothurians, and gastropods. The depth of Cordell Bank and distance from coastal runoff and sedimentation provide favorable conditions for settlement and growth of the branching hydrocoral, *Stylaster californica*. This slow growing species is common on the upper bank. Studies have shown that it can take 20 years for a colony to grow 30 cm tall. Gorgonians or pink corals are also a common element in the reeftop community. The high light penetration allows for algal photosynthesis far deeper than in nearshore coastal waters. In limited sampling of this benthic community by Cordell Expeditions, three species new to science were described from the upper reef areas of Cordell Bank.



Benthic Coverage on Cordell Bank Pinnacle (NOAA Photo)

B. Research on the Bank

1. Early Hydrographic Surveys

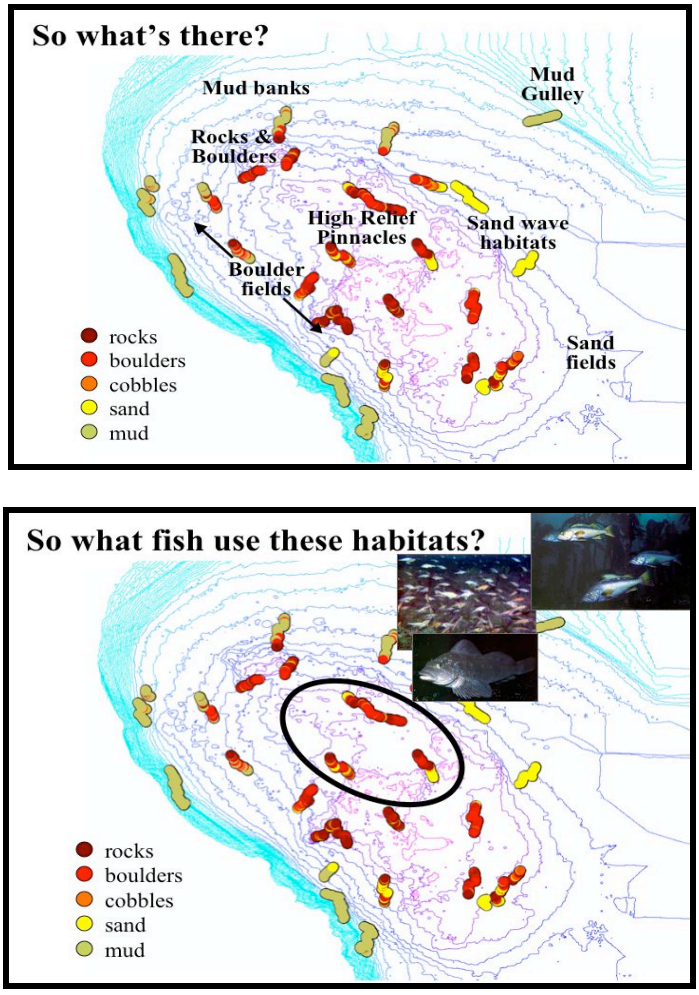
Hydrographic surveys of Cordell Bank were made in 1873, 1911, 1929, 1960-2, and 1985. G. Dallas Hanna of the California Academy of Sciences collected the first significant biological samples. He collected a few invertebrates during a series of dredging expeditions in the Gulf of the Farallones to collect rocks. The invertebrate samples were added to the permanent Academy collections. However, no account of the biota was ever published (Schmieder 1991, p. 27).

2. Seafloor Mapping

This seafloor mapping study, undertaken earlier this year, surveyed soft bottom habitats and low relief reef areas in Cordell Bank, Monterey Bay and Gulf of the Farallones national marine sanctuaries. Close to 300 miles of seafloor were mapped using side scan sonar. Researchers also used video to ground truth the side scan data and to characterize the soft bottom fish and invertebrate community. Surveys helped to document the diversity of sea life, health of habitat and characteristics of the seafloor, including a first look at many areas.

3. Habitat Characterization and Biological Monitoring

Since 2001, remotely operated vehicles (ROV) and the delta submersible have been used to characterize benthic habitats and document species distribution and abundance on and around Cordell Bank. The sanctuary plans to continue conducting these studies annually to increase the understanding of this unique environment and to better manage these resources.



Figures 12 & 13 Habitat Typing and Species Affinity, Delta Cruise 2002

4. Ecosystem Dynamics Study

The Sanctuary is conducting monthly cruises to monitor primary and secondary production and the distribution and abundance of seabirds and marine mammals. One component of this long-term study is acoustic monitoring of the relative abundance of krill, an important building block in the food chain for this area. Physical parameters are measured with vertical CTD casts and a thermosalinometer that constantly records surface salinity and temperature. Post processing incorporates remotely sensed temperature and chlorophyll in the survey area.

C. Purpose and Need for Action

Cordell Bank National Marine Sanctuary protects one of the most productive offshore areas in the United States, supporting healthy resident populations and is a destination feeding ground for many migratory marine mammals, seabirds, and fishes. The sanctuary includes a prolific invertebrate population on the Bank and in the surrounding water column. The combination of oceanic conditions and topography supports this rich and diverse community. CBNMS seeks to extend maximum protection to the core area of the Bank, within the 50 fathom isobath, to protect both the high relief of the Bank, and the exceptional invertebrate assemblage on the Bank.

The following goals and objectives for the stated proposed actions are consistent with the directives set forth by the National Marine Sanctuaries Act:

Goal

To maintain the natural biological communities, and where appropriate, restore and enhance it natural habitats, populations and ecological processes by eliminating avoidable adverse impacts to the Bank.

Management Objectives

- To develop and implement a coordinated plan for the protection and management of Cordell Bank with appropriate Federal agencies, State and local governments, international organizations, and other public and private interests;

- To facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of the Sanctuary not prohibited pursuant to other authorities

- To improve understanding of the Bank, its resources and qualities; and

- To improve public awareness and understanding of the significance and need to protect the Sanctuary's resources and qualities.

Need

Maximizing protection of the area within the 50 fathom isobath surrounding the Bank is necessary because of the following qualities and threats:

1. Qualities

Ecological

- Geologically special: The main feature of the Sanctuary is Cordell Bank, an offshore granite bank emerging from the soft sediments of the continental shelf. This granite bank is the northern most bathymetric feature on the California continental shelf.
- Geographically special: The presence of a high relief, rocky bank on the edge of the continental shelf 20 nautical miles from shore creates a unique and productive marine environment. The prevailing California Current flows southward along the coast while the upwelling of nutrient-rich, deep ocean waters stimulate the growth of planktonic organisms. These nutrients, combined with high light penetration in the waters surrounding the Bank, and the wide depth ranges in the vicinity, have led to a unique association of subtidal and oceanic species. Some species at Cordell Bank are deep-water forms, but most are known from nearshore waters and some are even found in the intertidal zone. One expression of this richness and the unusual conditions on the Bank is the occurrence of many species deeper or farther north or farther south than ever before known (Schiemder 1991).
- Biologically special: The combination of oceanic conditions and undersea topography support a rich and diverse marine community including resident and migratory marine mammals, seabirds, fishes, and invertebrates proliferating on the Bank and surrounding water column. Limited invertebrate collections by Cordell Expeditions in the early 1980s produced at least three species new to science, two nudibranch gastropods and one sponge.
- Habitat uniqueness: The vertical relief and hard substrate of the Bank provides benthic habitat with near-shore characteristics in an open ocean environment 20 nm from shore. The habitats of the Bank also support an abundance of fishes, seabirds and marine mammals.

Living Resources

- Fishes: Flatfishes such as sanddabs and several species of sole live on the mud and sandy bottom of the Sanctuary. Solitary bottom fish and schooling fish find refuge among the Bank's granite rocks and pinnacles. The area around Cordell Bank supports more than 44 species of rockfish, ranging in size from the 8-inch pygmy rockfish to the 3-foot yellow-eye rockfish. This info came from the Bio Geo Report
- Benthic organisms: The granite towers and reef areas between 120 ft (36 m) and 165 ft (50m) are a brilliant cascade of life. Space is limiting at these depths as sponges, ascidians, anemones, hydrocorals, and sea stars carpet the hard substrates, often one on top of the other. Many of the bottom dwelling organisms that live on Cordell Bank started life riding the currents of the Pacific Ocean as free floating larvae.
- Marine birds: Cordell Bank's food rich waters make it a major foraging locality for thousands of seabirds. This includes resident species that nest on the nearby Farallon Islands as well as highly migratory and vagabond pelagic birds.
- Marine mammals: Twenty-six species of marine mammals (whales, dolphins, seals, and sea lions) are known to frequent the waters around Cordell Bank. The Sanctuary is one of the most important feeding grounds in the world for the endangered Blue and humpback whales. These whales travel from their breeding areas in Mexico and Central America to feed on the abundant krill and schooling fish that aggregate near the Bank. In late summer, breaching humpbacks are frequently seen around the Bank. Populations of these endangered whales are starting to rebound after years of commercial harvest. Pacific white-sided dolphins are attracted by plentiful food resources and can be seen in large numbers. California sea lions,

elephant seals, northern fur seals, and Steller sea lions frequent Sanctuary waters to feed on krill, squid, and juvenile fishes.

Scientific

- Supports research and monitoring to improve management through: bathymetric and habitat surveys, larval recruitment and krill abundance studies, and marine mammal and seabird surveys.
- Provides opportunity to gather baseline data on the physical, biological, and chemical oceanography of the Sanctuary.
- Provides opportunity to initiate a monitoring program to assess environmental changes over time by: studying the relationship between oceanographic conditions and the distribution and abundance of marine organisms; and initiating visual assessments on the Bank to monitor the reef community.
- Supports research on correlation between habitat types and fish species distribution.

Education

- Provides opportunity to interpret research findings for the public.
- Provides opportunity for direct interaction with living marine resources
- The sanctuary offers opportunities for the public to learn about the Sanctuary program through community education programs, displays, brochures, classroom visits, student summits, outreach events, lecture series, outings, and teacher trainings.
- Provides opportunity for naturalist guided tours to the sanctuary. Many wildlife watchers make the trip seasonally to experience an open ocean environment and encounter wildlife like seabirds or whales that do not live near shore.

2. Threats

Cordell Bank is located about 43 nautical miles (nm) northwest of the Golden Gate Bridge and 20 nm west of the Point Reyes lighthouse. Due to the distance from land and unpredictable, and often rough sea conditions, access to the Bank is limited. Even so, the human use activity remains a threat to the health and function of the Bank.

Concern remains about the fragile quality of the Bank, particularly the high relief pinnacles and ridges and benthic organisms covering the Bank. Unlike habitats such as kelp forests and coral reefs, once the granite pinnacles have been compromised, there is no opportunity for recovery, they can and will remain rubble. The pinnacles and ridges of the Bank provide a hard substrate for attachment resulting in the thick coverage on the Bank comprised of sponges, anemones, hydrocorals, hydroids, and tunicates, and scattered crabs, holothurians, and gastropods. This benthic coverage in turn provides important habitat and food for fishes and other living marine resources. This area is one of complexity, sensitivity and ecological importance.

The following human use activities may be found incompatible with the Sanctuary's primary purpose of resource protection and would be considered a threat to the sensitive habit within the 50 fathom isobath surrounding Cordell Bank:

Marine Bioprospecting

Plants and invertebrates have historically provided a source for medicinal treatments, and pharmaceutical research has expanded into the marine environment. Recent inquiries about collecting Sanctuary resources for biochemical analysis are an indication of expansion in the field. Marine bioprospecting may include either sampling or continuous extraction of a living marine resource for commercial purposes. What differentiates marine bioprospecting from commercial fishing or kelp harvesting, for example, which are both extraction of living resources for commercial purposes, is the genetic value of the bioprospected resource. The Sanctuary may permit sampling under a research permit, but would prohibit continuous extraction to prevent injury to Sanctuary resources, to protect the biodiversity of the Sanctuary, and to preserve the natural functional aspects of the ecosystem.

Salvage of cultural resources
The abundance of shipwrecks along the California coast suggests that future underwater exploration of these resources is likely. Prehistoric use of the island, when the Bank was exposed during the last ice age, may also attract attention. Until recently, Cordell Bank and the surrounding seabed have been inaccessible due to location, depth, and currents. Improving technology, such as sonar, remotely operated vehicles, and manned submersibles, has reduced some constraints to exploration.

Commercial submerged cables
Rapid expansion of communication technology has created a sudden demand for installation of cables on the seafloor. Cable deployment in Cordell Bank National Marine Sanctuary is inappropriate given the nature of the bathymetry. Impacts to the submerged lands, the Bank, and the benthic coverage of the Bank, are unpredictable.

Fishing gear
The high vertical relief of the Bank discourages trawlers from fishing on the Bank. Data summaries for trawl sets from 1997 to 2002 indicate that trawl activity in the Sanctuary is on the soft sediments north of the Bank (trawl figure). The benthic cover and relief of the Bank also tend to entangle longlines. Data from submersible surveys on the Bank documents entangled gear on almost all of the 22 habitat survey tracks on the Bank. Most are long lines entangled on the bottom with a few remnant gill nets. What is of even greater concern than existing gear types and fisheries is the development of new gear types or fisheries that could negatively impact the invertebrate community or the reef structure in the high relief areas of the Bank. Historically, significant impacts can occur from developing fisheries faster than management can respond.

3. Manageability and enforcement
Due to the distance from land, and prevailing sea conditions at Cordell Bank NMS, regular and consistent on the water enforcement is not feasible. A strategy within the new 5-year management plan is to development an enforcement plan in coordination with other agencies. The United States Coast Guard has expressed interest in cooperative overflight enforcement efforts. Other potential partners include NMFS and CDFG. The enforcement plan will recommend taking a closer look at vessel tracking systems and increased observer presence.

In addition to a law enforcement presence, CBNMS will develop an interpretive enforcement plan. The Sanctuary's outreach program will target the recreational and commercial boating community in an effort to educate user groups about sanctuary regulations and the role of sanctuary management in resource protection. Experience in other sanctuaries has shown that voluntary compliance levels are high once user groups are informed about the unique characteristics of the sanctuary and the accompanying regulations.

D. Preferred Alternative

Cordell Bank National Marine Sanctuary: Protection of Cordell Bank and the Surrounding Area

The CBNMS regulations presently prohibit removing, taking, or injuring benthic invertebrates or algae on Cordell Bank or within the 50 fathom isobath surrounding the Bank, except for accidental removal, injury or takings during "normal fishing operations." After reviewing various management alternatives, the NMSP is considering narrowing this exception by allowing removal, injury or takings of benthic invertebrates or algae only as incidental and necessary to use of vertical hook-and-line fishing gear (including trolling gear, but excluding longlines) on Cordell Bank and within the 50 fathom isobath surrounding Cordell Bank. This would virtually eliminate the risk of impacts from fishing gear to the benthos on Cordell Bank and within the 50 fathom isobath. Related to this, the NMSP is also considering adding a new prohibition to CBNMS which would prohibit drilling into, dredging, or otherwise altering Cordell Bank or the submerged lands within the 50 fathom isobath; or constructing, placing, or abandoning any structure, material or other matter on the Bank or on the submerged lands within the 50 fathom isobath surrounding the Bank**;** however, vertical hook-and-line gear would also be excepted from this prohibition.

Consistent with this management alternative, the NMSP is requesting the PFMC to prepare draft sanctuary regulations that would except only vertical hook-and-line gear from the prohibition against removing, taking, or injuring benthic invertebrates or algae on Cordell Bank or within the 50 fathom isobath surrounding Cordell Bank. In addition, NMSP requests PFMC to prepare draft sanctuary regulations that would except only hook-and-line gear from the prohibition against drilling into, dredging, or otherwise altering Cordell Bank or the submerged lands within the 50 fathom isobath; or constructing, placing, or abandoning any structure, material or other matter on the Bank or on the submerged lands within the 50 fathom isobath surrounding the Bank. With this narrower exception, this prohibition would meet the goal of protecting Cordell Bank and the surrounding area from activities that could injure, cause the loss of, or destroy this sensitive benthic habitat. Bottom trawling, longlines, traps and all other fishing gear that could alter the submerged lands of these areas would be subject to this prohibition. The following language in bold text is intended to provide a regulatory model for the PFMC in modifying the exception to the current prohibition regarding the take of benthic invertebrates and algae:

> *Removing, taking, or injuring or attempting to remove, take, or injure benthic invertebrates or algae located on Cordell Bank or within the 50 fathom isbath surrounding the Bank. There is a rebuttable presumption that any such resource found in the possession of a person within the Sanctuary was taken or removed by that person.*

This prohibition does not apply to ~~***accidental***~~ *removal, injury or takings* ***as incidental and necessary to use of vertical hook-and-line gear*** *during normal fishing operations.*

The following language in bold text is intended to provide a regulatory model for the PFMC in drafting an exception for vertical hook-and-line fishing gear to the prohibition against altering the submerged lands of the Bank or within the surrounding 50-fathom isobath, or constructing, placing, or abandoning any structure or material or other matter on them:

Except as incidental and necessary to use of vertical hook-and-line fishing gear during normal fishing operations: *drilling into, dredging, or otherwise altering Cordell Bank or the submerged lands within the 50 fathom isobath; or constructing, placing, or abandoning any structure, material or other matter on the Bank or on the submerged lands within the 50 fathom isobath surrounding the Bank.*

E. Socioeconomic Impacts

Bioprospecting
Similar to scientific research, the bioprospecting for benthic invertebrates or other resources, could be controlled through the CBNMS research permit system. This would ensure that any collection allowed of these resources is conducted appropriately and in a strategic manner, accounting for cumulative impacts to the marine resources. Particularly that this possibility exists, any negative socio-economic impacts on any potential future bioprospectors are extremely speculative. CBNMS has received only one inquiry in the last 7 years regarding bioprospecting on Cordell Bank.

Cultural resources
CBNMS is already offered limited protection from the taking, moving or removing of historical resources under the National Historic Preservation Act, California State Penal Code Section 622.5 (Objects of Archaeological or Historical Interest), and the Abandoned Shipwreck Act of 1987. Since no explicit interest in taking, moving or removing historical resources has been expressed, the socioeconomic impacts from prohibiting disturbance to the submerged lands of the sanctuary will be negligible.

Submerged cables
Due to the high relief of the Bank, the laying of submerged cables would most likely be impractical. The limited size of the Sanctuary would make alternative routing of any cable a viable option. Socioeconomic impacts from the prohibition of laying cable, and disturbing of the submerged lands, is negligible.

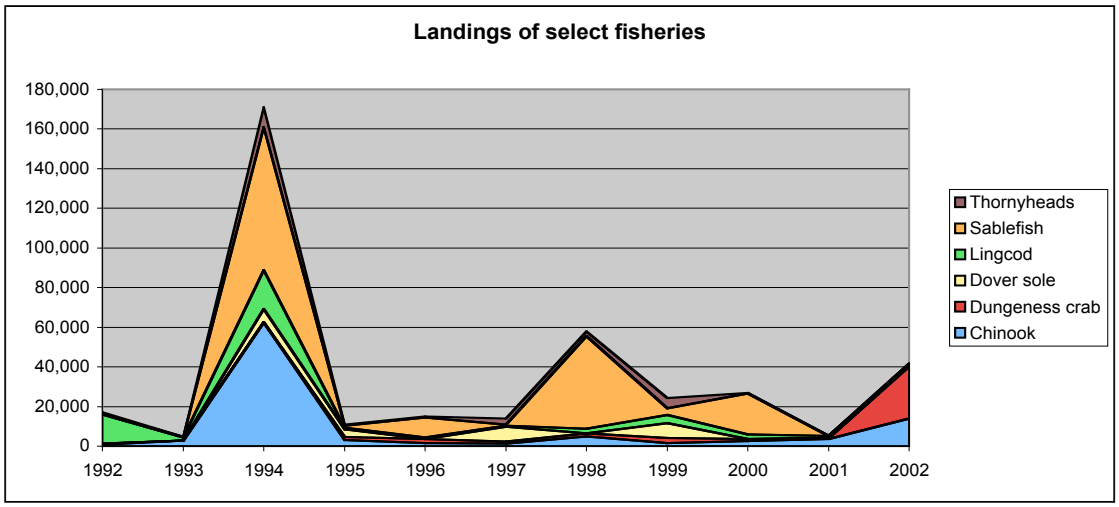


Figure 14. Landings of Select Fisheries in Fishing Blocks 441 and 451

Fishing

In the past, the Cordell Bank area has supported an active commercial and recreational fishery. Commercial fisheries have generally targeted rockfish, flatfish, salmonids, roundfish and albacore tuna. Recreational fisheries have generally focused on rockfish, lingcod, salmon, and albacore tuna.

Four fisheries have occurred throughout the range of the entire Sanctuary: Dungeness crab, highly migratory, groundfish and salmon. Nontrawl sectors such as salmon and pelagic fisheries are only described by landing receipts and not logbooks. The 50 fathom isobath surrounding Cordell bank is straddled by two CDFG fish blocks: 441 and 451. Effort is averaged over these 10 minute fish blocks, therefore is limited in its spatial explicity. Also, there are known quality issues with the veracity of the landing receipts data because the reporting relies on the fisherman reporting the block accurately, and the fish buyers accurately recording the blocks. Without observer data or other location information available, the broad geographic range of the blocks and questionable accuracy of landings data limits our understanding of the types and level of fishing activities taking place on the Bank. The Sanctuary's data collection efforts have been augmented by personal interviews some of which has been included below. The following information summarizes what is known about fishing activities taking place on Cordell Bank:

- Total catch within blocks 441 and 451 for 2002 for all fisheries (last year for which we have data) is 65,000 pounds.
- The highly migratory species fishery takes place in open water, to the west of the Bank, and the vast majority of landings are albacore. The total catch for 2002 was 7,000 pounds (we have processed landings for the last 11 years).
- Salmon landings are exclusively Chinook, with up to 40-50 trollers (pers. Com) known to fish on the Bank during a season. The total catch for 2002 was 14,000 pounds.
- There is no coastal pelagic fishery in CBNMS.
- The Dungeness crab fishery takes place on the shelf, not on the Bank.

- There are no squid landings reported for these blocks, confirmed by visual inspection of logbooks over the last three years.
- A groundfish closure is currently in place for both commercial and recreational fishing on the Bank.
- Mapping of trawl sets showing trawl intensity for 1997-2002 indicates minimal to no trawling took place within the 50 fathom isobath surrounding the Bank.
- Before the groundfish closure, one large party boat made approximately 100 trips annually to Cordell Bank, and six other party boats each made approximately 30-40 trips annually. Currently, no party boats fish on Cordell Bank (pers. Comm.).
- Ten longliners (whom also fish for crab and /or salmon) from Bodega Harbor, and two longliners from Bolinas regularly fished the Bank. However, since the groundfish closure all no boats out of Bodega are currently in operation (pers. Comm.)

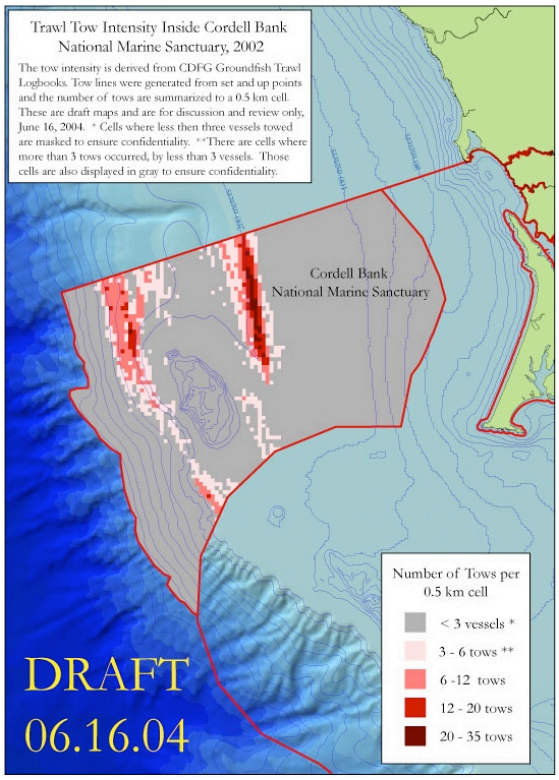


Figure 15. 2002 Trawl Tow Intensity Surrounding Cordell Bank

In conclusion, a preliminary simplified analysis of fishing activity indicates that, given current types and levels of fishing effort taking place on the Bank, the proposed regulatory actions would impose no additional socioeconomic burden on the fishing community. If the groundfish closure were to be lifted, there is the potential for socioeconomic impacts on longliners. Three factors need to be considered in evaluating socioeconomic impacts on this user group: 1) preliminary information indicates that at least 10 of the 14 known local longliners also participate in other fisheries (crab and/or salmon), from which they could presumably derive some income; 2) although this group may be displaced from the Bank, effort could be shifted to other areas both within and surrounding the Sanctuary so there would not be a total loss of income, although

some additional burdens may be realized; and 3) having realized the impact of the groundfish closure, indications are that at least 10 of these 14 boats have already been sold.

F. Conservation Benefits

The proposed actions to protect benthic invertebrates on the Bank and prohibit disturbance to the submerged lands within the 50 fathom isobath surrounding the Bank would protect the vulnerable, long-lived, fragile and slow-growing species which have long recovery times if impacted. It would also safeguard the fragile high relief on the Bank, particularly the pinnacles and ridges, from the threat of permanent destruction. The relief and benthic cover on the Bank supply food and shelter for many species of fishes. The restrictions would also protect the opportunity to better understand unique species associations or ecological processes by keeping them undisturbed. Regulations would also constitute an educational opportunity to educate the public about the resources on the Cordell Bank.

IV. CONCLUSION

We appreciate the time and effort of the Council and our partner organizations in developing these proposals for improved conservation in MBNMS and CBNMS. As indicated in the cover letter, we are looking forward to making a presentation regarding this request at the October/November Council meeting in Portland, OR. If we can be of assistance in any way please do not hesitate to contact us.

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Bob Black, Bodega Bay Harbor Master (personal communication, October 5, 2004)